

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**

	Type	Hits	Search Text	DBs
1	BRS	0	global adj scoreboard\$3	USPAT
2	BRS	4	local adj scoreboard\$3	USPAT
3	BRS	1	(copy\$3 or duplicat\$3) adj scoreboard\$3	USPAT
4	BRS	1	"6118776".PN.	USPAT
5	BRS	1	"6324181".PN.	USPAT
6	BRS	2	6614796.URPN.	USPAT
7	BRS	15	(multiple) adj scoreboard\$3	USPAT
8	BRS	0	(synchroniz\$3) adj scoreboard\$3	USPAT
9	BRS	0	(synchroniz\$3) adj scoreboard\$3	USPAT
10	BRS	2	(synch\$10) adj scoreboard\$3	USPAT
11	BRS	1	integer adj scoreboard\$3	USPAT
12	BRS	1	floating adj point adj scoreboard\$3	USPAT
13	BRS	51	scoreboard\$3 and replay	USPAT
14	BRS	0	stage adj scorebaord	USPAT
15	BRS	10	stage adj scoreboard	USPAT
16	BRS	10	stage adj scoreboard	USPAT
17	BRS	201	712/219.ccls.	USPAT
18	BRS	387	712/217.ccls.	USPAT
19	BRS	0	(back adj up) adj scoreboard	USPAT
20	BRS	0	(back adj up) adj (scoreboard or (reservation adj station))	USPAT
21	BRS	1	((back adj up) or shadow) adj (scoreboard or (reservation adj station))	USPAT
22	BRS	8	((back adj up) or shadow or copy) adj (scoreboard or (reservation adj station))	USPAT

BEST AVAILABLE COPY

	Type	L #	Hits	Search Text	DBs
1	BRS	L1	383	712/216.ccls.	USPAT

Web Images Groups News Froogle [more »](#)

Google "shadow scoreboard"  [Advanced Search](#)  
[Preferences](#)

## Web

Results 1 - 2 of 2 for "**shadow scoreboard**". (0.28 seconds)

Tip: Try removing quotes from your search to get more results.

## Sponsored Links

**IPCOM000005726D: SHADOW SCOREBOARD AND IMPLEMENTATION**

**SHADOW SCOREBOARD AND IMPLEMENTATION.** ... Page 1 of 2.  
MOTOROLA Technical Developments October 1988. **SHADOW SCOREBOARD AND IMPLEMENTATION.** by Yoav Talgam. ...  
[www.priorartdatabase.com/IPCOM/000005726/](http://www.priorartdatabase.com/IPCOM/000005726/) - [Similar pages](#)

Published technical disclosures (prior art) for the month of 2001 ...

**... SHADOW SCOREBOARD AND IMPLEMENTATION** [000005726]. 2001-10-31. Motorola's MC88100 processor is capable of concurrently processing multiple instructions at a ...  
[www.priorartdatabase.com/IPCOM\\_index/200110/](http://www.priorartdatabase.com/IPCOM_index/200110/) - [Similar pages](#)

**Electro-Mech Scoreboard**  
Scoreboards-Electronic Led Wireless  
All sports, sales and service  
[www.electro-mech.com](http://www.electro-mech.com)

**Varsity Scoreboards**  
Buy factory direct and save!  
Premier, wholesale scoreboards.  
[www.varsityscoreboards.com](http://www.varsityscoreboards.com)

**ScoreTronics, Inc.**  
Portable remote-controlled scoreboards for baseball & other sports.  
[www.scoretronics.com](http://www.scoretronics.com)

**Customized Scoreboards**  
wireless, wide angle, super bright LEDs, 5 year warranty, since 1990  
[www.scoreboards.net](http://www.scoreboards.net)

**Scoreboard at Amazon**  
3000+ Brands. 50+ Sports. One Cart.  
Amazon's New Sporting Goods Store.  
[www.amazon.com](http://www.amazon.com)

**Electronic Displays**  
Scoreboards and remote displays  
Outdoor or indoor use  
[www.norsk-display.com](http://www.norsk-display.com)

**Electronic scoreboards**  
Electronic scoreboards sign  
French manufacturer  
[www.charvet-industrie.com](http://www.charvet-industrie.com)

See your message here...

Free! Get the Google Toolbar. [Download Now](#) - [About Toolbar](#)

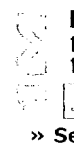
Google   49 Pop-ups blocked

"shadow scoreboard"

[Search within results](#) | [Language Tools](#) | [Search Tips](#) | [Dissatisfied? Help us improve](#)

[Google Home](#) - [Advertising Programs](#) - [Business Solutions](#) - [About Google](#)

©2004 Google

[IEEE HOME](#) | [SEARCH IEEE](#) | [SHOP](#) | [WEB ACCOUNT](#) | [CONTACT IEEE](#)[Membership](#) | [Publications/Services](#) | [Standards](#) | [Conferences](#) | [Careers/Jobs](#)Welcome  
United States Patent and Trademark Office[Help](#) | [FAQ](#) | [Terms](#) | [IEEE Peer Review](#)[Quick Links](#)**Welcome to IEEE Xplore®**

- ☐ Home
- ☐ What Can I Access?
- ☐ Log-out

**Tables of Contents**

- ☐ Journals & Magazines
- ☐ Conference Proceedings
- ☐ Standards

**Search**

- ☐ By Author
- ☐ Basic
- ☐ Advanced

**Member Services**

- ☐ Join IEEE
- ☐ Establish IEEE Web Account
- ☐ Access the IEEE Member Digital Library

**IEEE Enterprise**

- ☐ Access the IEEE Enterprise File Cabinet



Print Format

[Home](#) | [Log-out](#) | [Journals](#) | [Conference Proceedings](#) | [Standards](#) | [Search by Author](#) | [Basic Search](#) | [Advanced Search](#) | [Join IEEE](#) | [Web Account](#) | [New this week](#) | [OPAC Linking Information](#) | [Your Feedback](#) | [Technical Support](#) | [Email Alerting](#) | [No Robots Please](#) | [Release Notes](#) | [IEEE Online Publications](#) | [Help](#) | [FAQ](#) | [Terms](#) | [Back to Top](#)

Copyright © 2004 IEEE — All rights reserved

Your search matched **0** of **1058483** documents.A maximum of **500** results are displayed, **15** to a page, sorted by **Relevance Descending** order.**Refine This Search:**

You may refine your search by editing the current search expression or enter a new one in the text box.

☐ Check to search within this result set**Results Key:****JNL** = Journal or Magazine   **CNF** = Conference   **STD** = Standard**Results:****No documents matched your query.**

**Dialog DataStar**[options](#)[logout](#)[feedback](#)[help](#)[databases](#)[advanced search](#)**Advanced Search: INSPEC - 1969 to date (INZZ)**[login](#)

Search history:

No.	Database	Search term	Info added since	Results	
1	INZZ	scoreboard ADJ shadow	unrestricted	0	-

[hide](#) | [delete all search steps...](#) | [delete individual search steps...](#)Enter your search term(s): [Search tips](#) Information added since:  or:   
(YYYYMMDD)[search](#)

Select special search terms from the following list(s):

- ☐ Classification codes A: Physics, 0-1
- ☐ Classification codes A: Physics, 2-3
- ☐ Classification codes A: Physics, 4-5
- ☐ Classification codes A: Physics, 6
- ☐ Classification codes A: Physics, 7
- ☐ Classification codes A: Physics, 8
- ☐ Classification codes A: Physics, 9
- ☐ Classification codes B: Electrical & Electronics, 0-5
- ☐ Classification codes B: Electrical & Electronics, 6-9
- ☐ Classification codes C: Computer & Control
- ☐ Classification codes D: Information Technology
- ☐ Classification codes E: Manufacturing & Production
- ☐ Treatment codes
- ☐ INSPEC sub-file
- ☐ Publication types
- ☐ Language of publication

[Top](#) - [News & FAQs](#) - [Dialog](#)

© **2004** Dialog



**Dialog DataStar.**[options](#)[logout](#)[feedback](#)[help](#)[databases](#)[easy search](#)**Advanced Search: INSPEC - 1969 to date (INZZ)**[limit](#)

Search history:

No.	Database	Search term	Info added since	Results	
1	INZZ	scoreboard ADJ shadow	unrestricted	0	-

[hide](#) | [delete all search steps...](#) | [delete individual search steps...](#)Enter your search term(s): [Search tips](#) Information added since:  or: 

(YYYYMMDD)

[search](#)

Select special search terms from the following list(s):

- ☐ Classification codes A: Physics, 0-1
- ☐ Classification codes A: Physics, 2-3
- ☐ Classification codes A: Physics, 4-5
- ☐ Classification codes A: Physics, 6
- ☐ Classification codes A: Physics, 7
- ☐ Classification codes A: Physics, 8
- ☐ Classification codes A: Physics, 9
- ☐ Classification codes B: Electrical & Electronics, 0-5
- ☐ Classification codes B: Electrical & Electronics, 6-9
- ☐ Classification codes C: Computer & Control
- ☐ Classification codes D: Information Technology
- ☐ Classification codes E: Manufacturing & Production
- ☐ Treatment codes
- ☐ INSPEC sub-file
- ☐ Publication types
- ☐ Language of publication



priorartdatabase.com

IPCOM000005726D

<http://www.priorartdatabase.com/IPCOM/000005726D>

## SHADOW SCOREBOARD AND IMPLEMENTATION

Motorola's MC88100 processor is capable of concurrently processing multiple instructions at a single point of time if (1) the functional units processing each instruction is not full (there are multiple pipeline functional units: 3 stage integer processor, 5 stage floating point adder, 6 stage floating point multiplier) and if (2) the concurrently executing instructions are mutually independent - such that concurrent execution does not violate sequential program execution model.

---

Page 1 of 2

MOTOROLA Technical Developments October 1988

### SHADOW SCOREBOARD AND IMPLEMENTATION

by Yoav Talgam

Motorola's MC88100 processor is capable of concurrently processing multiple instructions at a single point of time if (1) the functional units processing each instruction is not full (there are multiple pipeline functional units: 3 stage integer processor, 5 stage floating point adder, 6 stage floating point multiplier) and if (2) the concurrently executing instructions are mutually independent - such that concurrent execution does not violate sequential program execution model.

The 88100 programming model is register based, i.e. all instruction operands originate and terminate in registers. Thus, the 88100 sequencer determines instruction dependencies through tagging the registers for being used as a destination of a yet incomplete instruction - withholding issuance of instructions as long as they declare a need to use such not-yet-ready operands or alter them as a result. This mechanism, which guarantees that concurrently executing instructions are independent, is called a scoreboard mechanism. It is implemented by keeping a single flag bit for each of the 32 88100 registers determining readiness. Logically, these 32 bit forms a control register - the processor scoreboard register.

In the 88100 many instructions can be outstanding when an internal exception or an external interrupt occurs. These outstanding instructions might correspond to many not-yet-ready registers, marked by their scoreboard flags. Logically, when context switching to the exception or interrupt handler context, no instructions of the current context may complete. Therefore, the processor scoreboard seen by the new context must indicate all ready. Tentatively, this could be accomplished by allowing all outstanding operations to complete prior to the context switch. This is useful in traps, where some of the outstanding instructions may be computing parameters for the operating system. In general, however, this is not desirable as some of the pipelines are of relatively long latencies and waiting for the whole machine to clear could result in high interrupt latency. Also, the outstanding instructions, if allowed to complete, might trigger further exceptions, which will necessitate additional complexity in the exception recovery logic.

The 88100 addresses this problem in a novel way: in addition to the processor scoreboard, a shadow scoreboard is implemented. During normal machine cycles, the shadow scoreboard follows (shadows) the processor scoreboard and the content of the processor scoreboard and the shadow scoreboard is identical. When an exception or interrupt is acknowledged by the machine, updates to the shadow scoreboard are immediately disabled. Thus, a copy of the processor scoreboard prior to when the machine enters exception

handling stage is kept in the shadow scoreboard. The processor scoreboard is then cleared, marking all machine resources as ava...

This text was extracted from a PDF file.

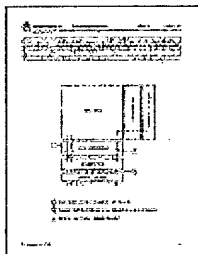
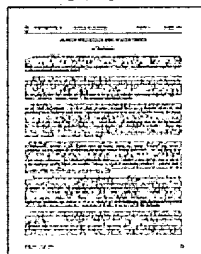
At least one non-text object (such as an image or picture) has been suppressed.

This is the abbreviated version, containing approximately 47% of the total text.



Originally disclosed by Motorola [1988-10]

Previewing pages 1-2 of 2



Keep up to date with our RSS newsfeed



Copyright © 2004 IP.com, Inc. - All rights reserved.



**IPCOM #** 000005726D

**Published** 2001-10-31

(view 2001-10 index)

**# pages** 2

**Language** English

**Format(s)** PDF  
(HTML)

**Purchase this document**

**Search the entire**   
**Prior Art Database on IP.com**

**This Page Blank (uspto)**

[Top](#) - [News & FAQs](#) - [Dialog](#)

© **2004** Dialog

**This Page Blank (uspto)**